

MACKAY FISH HATCHERY
ANNUAL REPORT

October 1, 1989 to December 31, 1990

Prepared By:

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INTRODUCTION

The Mackay Hatchery operates under "specialty" status, producing salmonids of various species and strains from 1 to 14 inches in length for statewide distribution. Production for the year exceeded 5.92 million fish, with a net poundage of 149,900 pounds (Table 1).

Cost of fish produced averaged \$1.182 per pound and \$.0299 per fish (Table 2).

Included in the year's production were 7 species and 14 different strains, as follows:

Rainbow Trout

- Arlee (Mt) (2 year classes)
- Mt. Shasta (Ca) (3 year classes)
- Pennask River (BC) (2 year classes)
- Lost River (Id)

Cutthroat Trout

- Henrys Lake
- Westslope (2 year classes)

Rainbow - Cutthroat Hybrids

- "Normal" hybrids
- Heat-shock triploid hybrids
- Methyl-testosterone sterilized hybrids

Coho Salmon

Fall Chinook Salmon (2 year classes)

Kokanee Salmon

- Early (Deadwood) Kokanee (2 year classes)
- October (Paulina Lake, Or) Kokanee (2 year classes)

Grayling

HATCHERY IMPROVEMENTS

1. Four new fiberglass troughs, each 15-ft X 2-ft X 2-ft deep were added to the battery of rearing troughs.

Table 1. Fish production at Mackay Hatchery, October 1, 1989 to December 31, 1990.

| Species & Strain | Lot Number | Source | Received as | Number/Pound Received or Carried Over (*) | Yield (Number/ Pound) | Destination and Comments |
|------------------------------|---------------|------------------------------------|----------------|--|-----------------------------|--|
| Rainbow R5 Mt. Shasta | 8-En-R5 | Ennis NFH, Mt. | eyed eggs | 13,300/ 13,000* | 13,250/ 13,250 | Mackay Reservoir |
| Rainbow R5 Mt. Shasta | 9-En-R5 | Ennis NFH, Mt. | eyed eggs | 126,500/ 12,777* | 137,572/ 58,662 | Region 6 Catchables, and Fingerling |
| Rainbow R5 Mt. Shasta | 0-En-R5 | Ennis NFH, Mt. | eyed eggs | 211,273/ | 142,420/ 19,356 | Region 6 Catchables, and Fingerling |
| Rainbow RA Arlee | 0-En-RA | Ennis NFH, Mt. | eyed eggs | 185,000/ | 153,725/ 14,309 | Region 6 Catchables, Holdovers |
| Rainbow RA Arlee | 1-En-RA | Ennis NFH, Mt. | eyed eggs | 199,966/ | 170,000/ alevins | Region 6 Catchables |
| Rainbow Rp Pennask R. | 9-F-Can | Summerland Trout Hatchery, B.C. | eyed eggs | 19,950/ 33* | 19,662/ 747 | Payette L., L. Hayden L. |
| Rainbow Rp Pennask R. | 0-F-Can | Summerland Trout Hatchery, B.C. | eyed eggs | 15,000/ | 10,948/ 68 | L. Payette Lake |
| Rainbow R1 Lost River | 0-Y-Id | Lost River Trout Co., Id. | eyed eggs | 17,000/ | 4,500/ 9 | Region 6 Mtn. Lakes, Remainder destroyed. |
| Cutthroat, C2 westslope | 9-U-Id-16 | McCall SFH, Id. | fry | 32,000/ 110* | 31,750/ 1,640 | Payette Lake |
| Cutthroat, C2 westslope | 0-U-Id-C2 | McCall SFH, Id. | fry | 60,000/ 125 | 53,250 408 | Salmon R. Mtn. Payette Lake |
| Cutthroat, C3 Henrys Lake | 0-U-Id-C3 | Henrys Lake SFH, Id. | eyed eggs | 1,423,7 | 1,030,981/ 9,285 | Henrys L., Rainbow |
| Brown Trout Saratoga | 0-Sr | Saratoga NFH, Wyo. | eyed eggs | 197,246/ | 160,000 alevins | Regions 4, 6. |
| Rb x C3 Hybrids RC | 9-U-Id-RC | Henrys Lake SFH, Id. | eyed eggs | 365,762/ 5,262* | 359,815/ 8,150 | Regions 5, 6. |
| R6 x C3 Hybrids RC | 9-RC-HOR | Henrys Lake SFH, Id. | eyed eggs | 35,800/ 596* | 35,000/ 700 | L. Payette, Warm L. Hormone Steriles. |
| Rb x C3 Hybrids RC | 0-U-Id-RC | Henrys Lake SFH, Id. | eyed eggs | 2,092,74 | 1,014,920/ 13,425 | Regions 1,2,3,5,6. |
| Rb x C3 Hybrids RC | 0-RC-Heat | Henrys Lake SFH, Id. | eyed eggs | 150,598/ | 57,600/ 610 | Is. Park, Rainbow L. Heat shocked. |
| Kokanee, KO October | 9-U-KOR | Paulina Lake, Oregon | green eggs | 486,599/ | 152,775 1,575 | Salmon Falls Res. |
| Kokanee, KO October | 0-U-Or | Paulina Lake, Oregon | green eggs | 557,788/ | 300,000/ alevins | Held over for Salmon Falls Reservoir |

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| Species & Strain | Lot Number | Source | Received as | Number/Pound Received or Carried Over (*) | Yield (Number, Pound) | Destination and Comments |
|------------------------|------------|------------------------------|-------------|---|-----------------------|---------------------------------|
| Kokanee, KE Deadwood | 9-U-Id-20 | Eagle SFH, Id. | eyed eggs | 998,000/ | 638,907/10,595 | Regions 2,3,5,6. |
| Kokanee, KE Deadwood | 0-U-Id-09 | Eagle SFH, Id. | eyed eggs | 1,181,095 | 815,000/679 | Held over |
| Fall Chinook wolflodge | 0-U-Id-46 | Cabinet Gorge SFH, Id. | eyed eggs | 57,997/ | 35,890/1,426 | Coeur d'Alene Lake |
| Fall Chinook wolflodge | 0-U-Id-FC | Cabinet Gorge, Sandpoint SFH | eyed eggs | 64,001/ | 45,000/44 | Held over for Cd'A. |
| Coho Columbia R. | 9-wd | willard NFH, Wa. | eyed eggs | 921,778/ | 551,500/19,950 | Cascade Res., 55,000 smolts. |
| Grayling Wyoming | 0-U-Id-07 | Ashton SFH, Id. | fry | 8,000/2.6 | 8,000/55 | wildhorse Creek, Mountain Lakes |

Table 1. Continued.MACKTABS

Table 2. Survival and cost of fish reared at Mackay Hatchery, October 1, 1989 to December 31, 1990.

| Size, Species, and Strain | % Survival from Beginning of Fish Year to Stocking | Survival from Egg to End of Fish Year | % Survival from Egg to Stocking | Cost | Cost/ Fish |
|---------------------------------------|---|--|---------------------------------------|----------|---------------|
| 14-inch Mt. Shasta rainbow | 100 | | | \$15,723 | \$1.18 |
| 12-inch Mt. Shasta rainbow | 100 | | | 27,162 | .198 |
| 10-inch Mt. Shasta rainbow | | | 67 | 22,969 | .16 |
| 6-inch Arlee rainbow | | | 83 | 16,980 | .11 |
| 5-inch Pennask River rainbow | 100 | | | 886 | .05 |
| 2-inch Pennask River rainbow | | 73 | | 68 | .006 |
| 1-inch Lost River rainbow | | | 26 | 3 | .05 |
| 5-inch westslope cutthroat | 99 | | | 1,946 | .06 |
| 3-inch westslope cutthroat | | 89 | | 487 | .01 |
| 3-inch rainbow-cutthroat hybrids (89) | 98 | | | 9,736 | .01 |
| 3-inch rainbow-cutthroat hybrids (90) | | | 49 | 15,931 | .015 |
| 3-inch heatshock RC hybrids | | | 38 | 1,724 | .012 |
| 3-inch October kokanee | | | 31 | 1,881 | .012 |
| 4-inch early kokanee | | | 64 | 12,572 | .019 |
| 1.5-inch early kokanee | | 69 | | 805 | .001 |
| 5-inch fall chinook | | | 62 | 1,692 | .05 |
| 1.5-inch fall chinook | | 70 | | 53 | .001 |
| 5-inch heat-shocked fall chinook | 31 | | | 29 | .04 |
| 4-inch coho | | 59 | | 18,630 | .037 |
| 8-inch coho smolts | | 58 | | 6,043 | .11 |

2. A 6-foot diameter circular rearing trough was installed outside the hatchery building for use in quarantine or isolation of small numbers of fish.
3. A 24,000 lb GVWR diesel cab and chassis was purchased to replace a gas-powered unit which carried the 900-gallon fingerling tank. Operation costs should decrease significantly, as this truck gets nearly twice the fuel mileage of the unit replaced.
4. A half-ton pickup was purchased to replace the old hatchery pickup truck.

FISH HEALTH

The Columbia River coho (Lot 9-Wd) suffered chronic infections of bacterial coldwater disease, Cytophaga psychrophila or Flexibacter psychrophis. Fourteen-day Oxytetracycline treatments were completed three times during the 6-month rearing cycle. Mortality would stop after each treatment, but would slowly increase during the several weeks after treatment. After the final TM treatment in May, mortality did not again rise, even in the 55,000 that were held to smolt in mid-August.

A summary of disease inspections is included in Table 3.

PUBLIC RELATIONS

Approximately 700 people toured the hatchery during the year. Due to its remote location and unfavorable climate, few people actually seek out the hatchery. Most are hunters and fishermen who happen here incidental to other activities.

Hatchery tours were given to school groups. Slide presentations were made for the local Chamber of Commerce.

SPECIAL PROJECTS

Sterile Hybrid Program

In the spring of 1989, the Henrys Lake Hatchery crossed approximately 160,000 Henrys Lake cutthroat eggs with Lake McConaughy rainbow sperm from the Ennis National Fish Hatchery for this project. During incubation, the eggs were immersed in a 0.40 mg/l solution of 17-alpha methyl testosterone for two hours at 63% and at 78% of hatch, as measured by temperature units. After eyeing, 134,000 of these eggs were shipped to the Mackay Hatchery. At the Mackay Hatchery, the resultant fry were given an identical treatment with the steroid

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Table 3. Fish health inspections at Mackay Fish Hatchery, October 1, 1989 to December 31, 1990.

| Sample Date | Species/Strain | Lot Number | Lab | Lop Number | VH | VP | VE | BK | BF | BR | BC | PX | PW | PC | PI | Comments |
|-------------|---------------------|------------|-----|------------|-------|----|----|----|----|----|----|----|----|----|----|------------------|
| 03/08/9 | Coho | 9-wd | | 90-62 | - | - | | | - | - | + | | | | | 3/6 BC |
| 04/10/90 | Fall chinook | 0-U-Id-46 | | 90-84 | - | - | | | | | | | | | | |
| 04/10/90 | Coho | 9-wd | | 90-85 | ----- | | | | | | | | | | + | 8/10 BC |
| 04/10/90 | westslope Cutthroat | 9-U-Id-16 | | 90-86 | ----- | | | | | | | | | | | 3/10 <u>BAC.</u> |
| 04/10/90 | Shasta rainbow | 0-En-R5 | | 90-87 | - | - | | | | | | | - | | | |
| 09/07/90 | Henrys Lake Cutt. | 0-U-Id-C3 | | 90-234 | - | - | | - | | | | | | | | |

+ = Positive Results

- = Negative Results

x = Testing/sampling Not Feasible

VH = IHNV, infectious hematopoietic necrosis virus

VP = IPNV, infectious pancreatic necrosis virus

VE = EIBS, erythrocytic inclusion body syndrome virus

BK = bacterial kidney disease agent, Renibacterium salmonarum

BR = enteric red mouth bacterium, Yersinia ruckeri

BC = bacterial cold water disease, Cytophaga psychrophila or Flexibacter psychrophilis

BF = bacterial furunculosis, Aeromonas salmonicida

PW = whirling disease agent, Myxobolus (Myxosoma) cerebralis

PX = PKX, agent of PKD, proliferative kidney disease PC

= Ceratomyxa shasta, agent of ceratomyxosis PI =

Infestation by Ichthyophthirius multifiliis

at 102% and 116% of hatch. As the fish began to feed, Rangen soft-moist feed was top-dressed with the methyl testosterone in a fish oil carrier to provide 10 mg of steroid per kg of feed, and fed for 90 days at a hatchery constant of 6. Most of these fish were planted in the late summer of 1989.

Three hundred and fifty of the treated fish were held at the Mackay Hatchery for histological inspection of the gonads during the next two years for an assessment of the efficiency of the sterilizing procedure. On March 8, 1990, a histological examination of 20 of the held-over individuals indicated 17 of the 20 possessed testes. This may indicate that sex reversal to XX-males was induced, rather than inducing sterility as planned. Further examinations will be made as the remaining 100 fish reach maturity.

Triploid Chinook Program

In the fall of 1989, fall chinook eggs were heat-shocked at the Cabinet Gorge Hatchery. In the fall of 1990, fall chinook eggs were heat-shocked at the Sandpoint Hatchery. (See annual reports from those hatcheries for details). Both treatments were done in an attempt to produce triploidy. Eyed eggs from those treatments were sent to the Mackay Hatchery. Of the 2,110 eggs received in November of 1989, 650 survived to stocking in July of 1990. After hatching, nearly all of the mortality was from deformities. Twenty-eight fish were tested for triploidy in July of 1990. Seventy-one percent were found to be 3N.

Triploid Rainbow-Cutthroat Hybrid Program

In the spring of 1990, kamloop-cutthroat hybrid eggs were likewise heat-shocked at the Henrys Lake Hatchery (see annual report from that hatchery for details). Those eggs were shipped to Mackay as eyed eggs. Of the 150,598 eyed eggs received, 57,600 survived to stocking in September and November of 1990. Unlike the chinook, obviously deformed individuals made up a much smaller percentage of the mortality. When induction of triploidy was checked in July of 1990, the two groups were found to be only 17% and 27% 3N. This low rate was considered to represent failure of triploidy induction, and the fish were not planted in Warm Lake as planned. They were stocked in Island Park Reservoir as part of the fingerling stocking plan for that reservoir.